REMARKS

Following entry of the above amendment, claims 1-15, 20-22, and 26 will be pending. Claims 16-19 and 23-25, drawn to a non-elected species, have been canceled. Claims 1 and 11 have been amended without change in scope to render moot indefiniteness rejections. Claim 26 has been added.

Objection to Specification

The specification stands objected to on the basis that the abstract contains the term "comprising." The abstract has been examined thoroughly, and it does not contain "comprising" or any related legal term. Accordingly, withdrawal of the objection is requested.

Indefiniteness Rejections

Claims 1 and 11 stand rejected under 35 USC 112, second paragraph, as being indefinite. Claims 1 and 11 have been amended to render moot the indefiniteness issues raised. Withdrawal of the rejections is respectfully requested.

Prior Art Rejections

Combination of Schade and Dobell

Claims 1-3 and 13 stand rejected under 35 USC 103(a) as obvious over German Patent Publication DD 222374 A1 ("Schade") in view of Dobell, U.S. Patent No. 2,781,658 ("Dobell"). Withdrawal of the rejection is respectfully requested for at least the following reasons.

A translation of Schade is appended to this Reply. Schade discloses a crimped or press-on socket connector for joining steel rebar. According to Schade, hardened metal rings 3 may be pushed onto a smooth rebar 1. The smooth rebar 1 may then be joined to a ribbed rebar 2 by pushing a connecting socket 4 over the joint between the rebars 1 and 2, and by pressing or crimping the socket 4 onto the bars 1 and 2 in stages. Reference number 41 in Figs. 1 and 2 of Schade indicates a completed

pressed portion of the socket 4, while reference number 42 indicates an as-yet-unpressed portion of the socket 4. Prior to the pressing, the socket 4 has a smooth inner surface, as can be seen in Fig. 1 of Schade. Schade does not disclose placement of the metal rings 3 into the socket 4 prior to insertion of the smooth rebar 1 into the socket 4, nor does Schade disclose any means for maintaining the rebars or metal rings in the socket 4 prior to the pressing or crimping process.

Dobell discloses a post-stressed concrete structure that includes end anchorages 11-16 for maintaining tension, initially placed by a hydraulic jack, in reinforcing rods 17-19. Dobell discloses that within each of the anchorages there is a stack or nest of pronged plates 35, separated by washers 36. The pronged plates 35 are configured to allow the ends of the rods 17-19 to be pulled outward under the tension of the hydraulic jack, and to maintain the tension after the hydraulic jack is removed, by preventing the rod ends from being pulled back into the concrete slab. Dobell does not disclose a reinforcing bar connector.

Claim 1 recites a reinforcing bar connection for joining reinforcing bars end-to-end, the connection including a sleeve and spring finger washers mounted in the sleeve, wherein the washers each have a flexible inner edge adapted to expand around reinforcing bar ends projecting into each end of said sleeve and to bite into and grip the bar ends to prevent withdrawal. Claim 1 is patentable over Schade and Dobell at least because it would not have been obvious to modify Schade's press-on socket connector to include Dobell's pronged plates. As is evident from the above description, Schade's press-on socket connector is a totally different type of connector than the claimed reinforcing bar connection. The function of Schade's metal rings 3 is to provide some texture to the smooth rebar 1, to allow gripping by the crimped or pressed on portions 42. The metal rings 3 do not bite into the smooth rebar 1, and are held in place by the crimped portions of the socket 4 between the metal rings 3. There would be no reason to substitute Dobell's pronged plates 35 for Schade's metal rings 3, at least because the one-way biting action of Dobell's pronged plates is not needed in Sch de's connector. Further, if Dobell's prong plates w re substituted for Schade's metal rings 3, the

crimping or pressing of Schade's socket 4 would almost certainly destroy the integrity and structure of the pronged plates, rendering them unable to perform their intended function. For these reasons it would not have been obvious to make the proposed combination of Schade and Dobell. Therefore claims 1-3 and 13 are patentable over Schade and Dobell.

Combination of Schade, Dobell, and Lande

Claims 4, 5, and 9-12 stand rejected under 35 USC 103(a) as obvious over Schade in view of Dobell, further in view of UK Patent Publication GB 2 034 857 A ("Lande"). Withdrawal of the rejection is respectfully requested for at least the following reasons.

Lande discloses a connector for concrete reinforcing bars. Ends of the reinforcing bars 12 and 14 are placed into a cast steel sleeve 10 that has a plurality of grooves 18 along an inner surface. A resin is then injected into the sleeve 10 through apertures 28.

Lande does not remedy the defects discussed above with regard to the proposed combination of Schade and Dobell. For this reason alone claims 4, 5, and 9-12 are patentable over Schade, Dobell, and Lande.

In addition, it would have not have been obvious to modify's Schade's socket connector to include Lande's grooves 18 and resin. There would no reason to include Lande's grooves in Schade's press-on socket 4, since the grooves would be crushed in the crimping process, and might hinder sliding of the rebar 1 (with the metal rings 3) into the socket 4. There would also be no reason to introduce resin into Schade's socket 4. Schade's connector relies on crimped or deformed metal of the socket 4 to maintain the rebar 1 and the metal rings 3 in the socket. Given the holding power of Shade's crimped socket, why would anyone add resin? Since there is no motivation for modifying Schade's connector to include Lande's grooves and resin, for another reason claims 4, 5, and 9-12 are patentable over Schade, Dobell, and Lande.

Combination of Schade, Dobell, Lande, and Kadota

Claims 6-8, 11, 12, and 20-22 stand rejected under 35 USC 103(a) as obvious over Schade in view of Dobell and Lande, and further in view of UK Patent Publication GB 2 192 210 A ("Kadota"). Withdrawal of the rejection is respectfully requested for at least the following reasons.

Kadota discloses a one-piece cast iron shell 10 for containing a pair of reinforcing bars 20 and 29. The shell 10 has a grouting port 14 and a vent port 13 to facilitate filling the shell with a grout 34 to secure the bars 20 and 29 within the shell 10.

Kadota does not make up for the deficiencies discussed above with regard to the proposed combinations of Schade and Dobell, and Schade, Dobell, and Lande. Therefore claims 6-8, 11, 12, and 20-22 are patentable over Schade, Dobell, Lande, and Kadota.

In addition, claim 20 recites a method that includes inserting a bar end in each end of a sleeve to deflect flexible inner edges of washers, so that the inner edges of the washers bite into and grip bar ends. None of the references teach or suggest this feature. Schade discloses placing the metal rings 3 on the smooth rebar 1 before the rebar is inserted into the socket. Dobell does not disclose connecting reinforcing bars, and does not disclose a sleeve with bars inserted in each end. Lande and Kadota do not disclose flexible washers that deflect and bite into bar ends. Since none of the references teach or suggest the recited features of claim 20, for an additional reason claims 20-22 are patentable over Schade, Dobell, Lande, and Kadota, either alone or in combination.

Newly-Added Claim

Newly-added claim 26 depends upon claim 12, and is patentable over the applied references at least for the reasons given above for the patentability of claim 12.

Conclusion

In view of the foregoing, withdrawal of rejections is respectfully requested, in which case the application would be in condition for allowance.

Should the Examiner believe that a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

In the event that an extension of time is necessary, this should be considered a petition for such an extension. No fee is believed due with the filing of this paper. In the event any fees are due in connection with the filing of this paper, the Commissioner is authorized to charge those fees to our Deposit Account No. 18-0988 (Charge No. ERICP328USA).

Respectfully submitted,

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(54) Pressed-on Connecting Socket for Reinforcing Bars

(57) The invention concerns a press-on connecting socket for axial butt joints of steel reinforcing bars of equal or unequal diameters. The objective of the invention is the maximum transfer of the mean tensile strength of the non-butted steel across butt joints of smooth reinforcing bars as well as butt joints between smooth and ribbed steel reinforcing bars. The invention addresses the problem of achieving an increase of the friction between the socket and the steel rebar in joints with pressed-on connecting sockets. According to the invention, this is achieved by hardened metal rings (3) located between the rebar and the connecting socket (4), where the interior diameter of the rings corresponds to the exterior diameter of the rebar (1) on which they are placed. Fig.1

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Title of the invention:
Press-on Connecting Socket for Concrete Rebar

Area of application of the invention:
The invention concerns a pressed-on connecting socket for axial butt joints of steel reinforcing bars of equal or unequal diameters. It can be used for smooth as well as for ribbed rebar, and also for attaching sockets to pipes, cables, ropes, or for similar purposes.

Characteristics of known technical solutions:
When using a pressed-on socket connector for joining steel rebar, the objective is a transfer of the tensile strength of the non-butted rebar that is as close to 100 percent as possible, in order to fully exploit the strength of the rebar even at the butt joint. In order to achieve this, DE – OS 1 806 665 proposes to press a steel socket with a lower hardness than that of the rebar onto the rebar step-by-step in order to join ribbed rebar. This causes the steel to flow in between the ribs of the rebar, resulting in a secure coupling.

In cases where it is necessary to join smooth rebar by means of pressed-on connecting sockets, DE – AS 1 264 025 proposes the use of a socket with interior ribs that is harder than the rebar to be joined so that, when the socket is pressed on, its interior ribs are pressed into the rebar, ensuring a secure force transfer without slippage. The disadvantage of this solution is the high manufacturing cost of this type of socket that makes this type of joint more expensive. In addition, there are problems when it comes to joining smooth and ribbed rebar, because the ribbed rebar is harder and there is no guarantee that the steel of the socket will flow in between the ribs of the rebar when the socket is pressed on.

In order to increase the friction between the rebar and the connecting socket, DE – OS 2 720 642 proposes to sprinkle hard granulate between the rebar and the socket prior to the pressing process during which the granulate imbeds itself in both the rebar and the socket. This process can not be used at the construction site because a uniform distribution of the granulate is impossible there, with the consequence that there is no uniform force transfer at the butt joint which, in turn, reduces the tensile strength of the joint.

Objective of the invention:
The invention has the purpose of developing a pressed-on connecting socket that permits a high transfer of the tensile strength across joints of smooth rebar as well as across joints of smooth and ribbed rebar, and that can also be used for joining rebar of unequal diameter.

Characteristics of the invention:
The invention addresses the problem of achieving a force transfer between the rebar and the socket that can be fully adapted to the individual requirements, and to accomplish this with a socket of the shortest possible length that makes it possible to produce such joints on-site at construction sites.

The invention solves this problem by proposing the insertion of hardened metal rings between the rebar to be joined and the pressed-on connecting socket. The metal rings can be placed on one or on both sides of the butt joint, and they are always put in place when the surfaces of the rebar and the socket to be pressed together are not ribbed. If rebar of unequal diameter is to be joined, an additional sleeve that compensates for the difference in diameter is pressed onto the rebar of smaller diameter, using metal rings if necessary. Then, a connecting socket is placed over the joint, and metal rings are inserted between the smooth interior surface of the socket and the smooth surface of the rebar as well as the smooth surface of the compensating sleeve.

Sample version:
The invention is described in detail with the help of a sample version. On the page of drawings,
Fig. 1 shows the joint between a ribbed reinforcing bar and a smooth reinforcing bar of equal diameter;
Fig. 2 shows the joint between two smooth reinforcing bars of unequal diameter.

As shown in Fig. 1, when a smooth reinforcing bar 1 is joined with a ribbed reinforcing bar 2 of equal diameter, several hardened metal rings 3 whose interior diameter corresponds to the diameter of the rebar are pushed onto the rebar 1 where they are held in place by friction. Then, a connecting socket 4 is pushed over the butt joint 6 and is pressed on step-by-step. The completed steps of the pressing process are indicated by 41, while 42 indicates the section of the connecting socket 4 that has not been pressed on yet. The press-fitting of the connecting socket 4 can be done during the fabrication of the rebar already so that on site it only needs to be pressed onto the rebar to be attached.

For joining two reinforcing bars of unequal diameter with a connecting socket, Fig. 2 illustrates the variant involving two smooth steel bars. First, appropriate metal rings 31 are placed on the bar with smaller diameter; then, a sleeve 5 is pressed on to it so that now both bars have the same exterior diameter. Following that, metal rings 3 are placed on the reinforcing bar 1 and the pressed-on sleeve 5. The subsequent pressing process produces a socket joint of high tensile strength. The number of metal rings is determined by the tensile forces to be transferred, and the same applies to the length of the connecting socket 4 which should be approximately 7 times the diameter of the rebar. This type of connection can also be used to advantage for pressing sockets onto pipes, cables, or ropes, or for attaching the same to each other.

Patent Claim

Pressed-on socket connection for concrete reinforcing bars and similar items, consisting of a socket that is placed over the butt joint and is pressed on step-by-step, characterized by the feature that hardened metal rings (3) are placed between the smooth surfaces to be pressed together, either on one side or on both sides of the butt joint (6) of the reinforcing bars (1; 11; 2) between the rebar (1) and the connecting socket (4), or between the rebar (11) and the sleeve (5), and also between the sleeve (5) and the connecting socket (4).

Attached: One page of drawings